

Amendments to the Claims

Claims 1 and 2 (Cancelled).

3. **(Currently amended)** The device linkage control apparatus according to Claim ~~2~~ 32,

wherein the episode creation unit creates the plurality of episode data, based on previously stored episode data creation rules, by gathering the element data included in the respective life data accumulated by the life data accumulation unit.

4. **(Currently amended)** The device linkage control apparatus according to Claim ~~2~~ 32,

wherein the episode analysis unit structuralizes ~~the co-occurrence-an associated~~ use relationship by representing, as a frequent pattern tree, an appearance frequency and a combination pattern of the element data included in the plurality of episode data created by the episode creation unit, the frequent pattern tree associating, in each node, a type of the element data and a frequency which indicates said appearance frequency.

5. **(Original)** The device linkage control apparatus according to Claim 4,

wherein the episode analysis unit includes:

a frequency derivation unit operable to calculate the frequency of each element data included in the plurality of episode data;

a sorting unit operable to rearrange the element data within each of the plurality of episode data, in a decreasing order of frequency; and

a frequent pattern tree generation unit operable to generate, with regard to the plurality of episode data, the frequent pattern tree by sequentially retrieving the element data, and placing the retrieved element data as new nodes in the frequent pattern tree, or incrementing the frequency of an existing node.

6. **(Currently amended)** The device linkage control apparatus according to Claim ~~[[4]]~~ 32,

wherein the life pattern interpretation unit generates, as the life pattern information, information indicating a combination of devices corresponding to nodes that are in a parent-offspring relationship in the frequent pattern tree.

7. **(Currently amended)** The device linkage control apparatus according to Claim 6,

wherein the life pattern interpretation unit includes:

a node detection unit operable to detect a current node in the frequent pattern tree;

a parent node detection unit operable to detect all nodes that are parent nodes of the detected node; and

a life pattern output unit operable to output, as the life pattern information, information indicating that a device corresponding to the detected parent node and a device corresponding to the current node are in ~~a co-occurrence~~ an associated use relationship.

Claim 8 **(Cancelled)**

9. **(Currently amended)** The device linkage control apparatus according to Claim-8 32,

wherein the episode analysis unit includes:

a frequency derivation unit operable to calculate the frequency of each element data included in the plurality of episode data;

a sorting unit operable to rearrange the element data within the each of the plurality of episode data, in a decreasing order of frequency;

a frequent pattern tree generation unit operable to generate, with regard to the plurality of episode data, the frequent pattern tree by sequentially retrieving the element data, and placing the retrieved element data as new nodes in the frequent pattern tree, or incrementing the frequency of an existing node;

a subtree extraction unit operable to separate the generated frequent pattern tree into subtrees having, as new roots, nodes which are offspring of the root of the frequent pattern tree;

an episode re-creation unit operable to create episode data from the separated subtrees;

a reconstruction unit operable to reconstruct the subtrees by repeating, on the created episode data, the calculation by the frequency derivation unit, the rearrangement by the sorting unit, and the frequent pattern tree generation by the frequent pattern tree generation unit; and

a subtree combining unit operable to combine the reconstructed subtrees to the original pattern tree.

10. **(Currently amended)** The device linkage control apparatus according to Claim 8 32,

wherein the episode analysis unit includes:

an input episode data storage unit operable to store, as input episode data, the plurality of episode data created by the episode creation unit;

an input episode number determination unit operable to obtain a number of the input episode data stored in the input episode data storage unit;

a most-frequent element identification unit operable to identify the element data with the highest frequency from within each input episode data;

a most-frequent element extraction unit operable to extract the element data with the highest frequency from within each input episode data, and add the extracted element data to output episode data;

an output episode data storage unit operable to store the output episode data;

an input episode classification unit operable to classify the input episode data according to the type of the element data; and

a frequent pattern tree generation unit operable to generate the frequent pattern tree that associates, in respective nodes, the appearance frequency and combination pattern of the element data with the type of the element data and the frequency which indicates said appearance frequency, the element data being included in the output episode data stored in the output episode data storage unit.

11. **(Currently amended)** The device linkage control apparatus according to Claim ~~2~~ 32,

wherein the episode creation unit creates element data respectively indicating a device and the usage time of the device based on the life data, and creates, in the case where the usage times of the respective element data have a fixed inclusive relationship or an overlapping relationship, episode data that includes said respective element data.

12. **(Currently amended)** The device linkage control apparatus according to Claim ~~2~~ 32,

wherein the episode creation unit creates, based on the life data, event data respectively indicating a device, an event occurring with the device, and an occurrence time of the event, and creates, in the case where the occurrence times of the respective event data have a fixed inclusive relationship or an overlapping relationship, episode data including element data corresponding to the devices indicated by said respective event data.

13. **(Currently amended)** The device linkage control apparatus according to Claim 6,

wherein the life pattern interpretation unit calculates, for each of the nodes that are in the parent-offspring relationship in the frequent pattern tree, a confidence level indicating a degree of ~~the co-occurrence~~ an associated use relationship, and generates the life pattern information with only the nodes that are connected with a confidence level that is equal to or higher than a fixed value.

14. **(Currently amended)** The device linkage control apparatus according to Claim ~~4~~ 32,

wherein, in the case where it is detected that a state of a first device indicated in the life pattern information has changed, the control unit causes a state of a second device indicated in the life pattern information to change by controlling the second device.

15. **(Original)** The device linkage control apparatus according to Claim 14,

wherein a first and a second device respectively include a timer, and in the case where it is detected that setting details of the timer included in the first device is changed, the control unit changes setting details of the timer included in the second device.

16. **(Original)** The device linkage control apparatus according to Claim 15, wherein, in the case where it is detected that a setting of a preset time of the timer included in the first device is changed, the control unit changes a setting of a preset time of the timer included in the second device in such a way that a difference between the times before changing and the times after changing is the same.

17. **(Original)** The device linkage control apparatus according to Claim 14, wherein, in the case where it is detected that the state of the first device indicated in the life pattern information has changed, the control unit i) previously generates and records change information indicating that the state of the second device indicated in the life pattern information should be changed, and ii) causes the state of the second device to change by controlling the second device according to the change information after a predetermined time elapses.

18. **(Original)** The device linkage control apparatus according to Claim 17, wherein the first and the second devices respectively include a timer, and in the case where it is detected that setting details of the timer included in the first device is changed, the control unit i) previously generates and records change information that includes an instruction to change the setting details of the timer included in the second device and a designation for a time for said change, and ii) changes the setting details of the timer included in the second device according to the change information when said time comes.

19. **(Original)** The device linkage control apparatus according to Claim 14, wherein the control unit previously stores a plurality of linkage information identifying details of the control and selection condition information indicating

conditions for selecting one linkage information from among the plurality of linkage information; and in the case where it is detected that the state of the first device indicated in the life pattern information has changed, the control unit selects one of the plurality of linkage information by referring to the selection condition information, and causes the state of the second device indicated in the life pattern information to change, by controlling the second device according to the selected linkage information.

20. **(Currently amended)** The device linkage control apparatus according to Claim 19,

~~wherein the linkage information indicates a difference between preset times of timers included in the first and second devices~~ the first and the second devices respectively include a timer,

the linkage informage indicates a difference between preset times of timers included in the first and second devices,

the selection condition information indicates a correspondence of a setting value of the preset time of the timer included in the first device and the linkage information that needs to be selected, and

in the case where it is detected that setting details of the preset time of the timer included in the first device is changed, the control unit selects one linkage information corresponding to the changed preset time from among the plurality of linkage information by referring to the selection condition information, and changes the preset time of the timer included in the second device according to the selected linkage information.

21. **(Original)** The device linkage control apparatus according to Claim 14,

wherein the first and the second devices respectively include a timer, and

in the case where it is detected that setting details of the timer included in the first device is cancelled, the control unit cancels the setting details of the timer included in the second device.

22. **(Original)** The device linkage control apparatus according to Claim 14,

wherein the first and the second devices respectively include a timer, and

in the case where it is detected that setting details of the timer included in the first device is changed, the control unit causes the second device to make a sound output or a display output by controlling the second device, said output indicating that said setting details is changed.

Claims 23-31 (Cancelled)

32. (New) A device linkage control apparatus which identifies a frequency of associated use between devices among a plurality of devices, and controls, in linkage with each other, a set of devices having a high frequency for being used in association with each other, the apparatus comprising:

- a life data accumulation unit operable to accumulate life data indicating a usage history of the plurality of devices;

- an episode creation unit operable to create, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

- an episode analysis unit operable to create, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other;

- a life pattern interpretation unit operable to identify, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other; and

- a control unit operable to control, in linkage with each other, said device sets having a high frequency for being used in association with each other,

- wherein, with regard to subtrees having respective nodes of the frequent pattern tree as roots, the episode analysis unit constructs the frequent pattern tree with a structure in which element data having a highest frequency becomes a root of a subtree,

- the life pattern interpretation unit identifies, based on the frequent pattern tree, a device A and a device B, which have a high frequency for being used in association with each other, as a combination having a high association frequency, even when each of said

device A and said device B are combined and used in association with various other devices, and

the control unit controls, in linkage with each other, at least said device A and said device B.

33. **(New)** A device linkage control method, for use in a device linkage control apparatus, for identifying a frequency of associated use between devices among a plurality of devices, and controlling, in linkage with each other, a set of devices having a high frequency for being used in association with each other, the method comprising:

a life data accumulation step of accumulating life data indicating a usage history of the plurality of devices;

an episode creation step of creating, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

an episode analysis step of creating, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other;

a life pattern interpretation step of identifying, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other; and

a control step of controlling, in linkage with each other, said device sets having a high frequency for being used in association with each other,

wherein the life data accumulation step, the episode creation step, the episode analysis step, the life pattern interpretation step, and the control step are executed by the device linkage control apparatus,

with regard to subtrees having respective nodes of the frequent pattern tree as roots, the frequent pattern tree is constructed, in the episode analysis step, with a structure in which element data having a highest frequency becomes a root of a subtree,

in the life pattern interpretation step, a device A and a device B which have a high frequency for being used in association with each other are identified, based on the

frequent pattern tree, as a combination having a high association frequency, even when each of said device A and said device B are combined and used in association with various other devices, and

in the control step, at least said device A and said device B are controlled in linkage with each other.

34. (New) A program, for use in a device linkage control apparatus, for identifying a frequency of associated use between devices among a plurality of devices, and controlling, in linkage with each other, a set of devices having a high frequency for being used in association with each other, the program being held in a storage unit of said device linkage control apparatus, and causing a CPU which controls operation of said device linkage control apparatus to execute:

a life data accumulation step of accumulating life data indicating a usage history of the plurality of devices;

an episode creation step of creating, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

an episode analysis step of creating, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other;

a life pattern interpretation step of identifying, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other; and

a control step of controlling, in linkage with each other, said device sets having a high frequency for being used in association with each other,

wherein, with regard to subtrees having respective nodes of the frequent pattern tree as roots, the frequent pattern tree is constructed, in the episode analysis step, with a structure in which element data having a highest frequency becomes a root of a subtree,

in the life pattern interpretation step, a device A and a device B which have a high frequency for being used in association with each other are identified, based on the frequent pattern tree, as a combination having a high association frequency, even when each of said device A and said device B are combined and used in association with various other devices, and

in the control step, at least said device A and said device B are controlled in linkage with each other.

35. (New) A device linkage control system comprising a plurality of devices and a control apparatus that are connected to each other by a transmission line, the control apparatus controlling the plurality of devices in linkage with each other,

wherein the control apparatus includes:

a life data accumulation unit operable to accumulate life data indicating a usage history of the plurality of devices;

an episode creation unit operable to create, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

an episode analysis unit operable to create, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other;

a life pattern interpretation unit operable to identify, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other; and

a control unit operable to control, in linkage with each other, said device sets having a high frequency for being used in association with each other,

wherein, with regard to subtrees having respective nodes of the frequent pattern tree as roots, the episode analysis unit constructs the frequent pattern tree with a structure in which element data having a highest frequency becomes a root of a subtree,

the life pattern interpretation unit identifies, based on the frequent pattern tree, a device A and a device B, which have a high frequency for being used in association with

each other, as a combination having a high association frequency, even when each of said device A and said device B are combined and used in association with various other devices, and

the control unit controls, in linkage with each other, at least said device A and said device B.

36. (New) A life pattern information generating apparatus that generates life pattern information for a device linkage control apparatus that controls a plurality of devices in linkage with each other based on the life pattern information, the life pattern information generating apparatus comprising:

a life data accumulation unit operable to accumulate life data indicating a usage history of the plurality of devices;

an episode creation unit operable to create, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

an episode analysis unit operable to create, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other; and

a life pattern interpretation unit operable to identify, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other,

wherein, with regard to subtrees having respective nodes of the frequent pattern tree as roots, the episode analysis unit constructs the frequent pattern tree with a structure in which element data having a highest frequency becomes a root of a subtree, and

the life pattern interpretation unit identifies, based on the frequent pattern tree, a device A and a device B, which have a high frequency for being used in association with each other, as a combination having a high association frequency, even when each of said device A and said device B are combined and used in association with various other devices.

37. (New) A life pattern information generation method for generating, using a life pattern information generation apparatus, life pattern information for a device linkage control apparatus that controls a plurality of devices in linkage with each other based on the life pattern information, the method comprising:

a life data accumulation step of accumulating life data indicating a usage history of the plurality of devices;

an episode creation step of creating, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

an episode analysis step of creating, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other; and

a life pattern interpretation step of identifying, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other,

wherein the life data accumulation step, the episode creation step, the episode analysis step, and the life pattern interpretation step are executed by the life pattern information generation apparatus,

with regard to subtrees having respective nodes of the frequent pattern tree as roots, the frequent pattern tree is constructed, in the episode analysis step, with a structure in which element data having a highest frequency becomes a root of a subtree, and

in the life pattern interpretation step, a device A and a device B which have a high frequency for being used in association with each other are identified, based on the frequent pattern tree, as a combination having a high association frequency, even when each of said device A and said device B are combined and used in association with various other devices.

38. (New) A program for generating, using a life pattern information generation apparatus, life pattern information for a device linkage control apparatus that controls a plurality of devices in linkage with each other based on the life information, the program

being held in a storage unit of said life pattern information generation apparatus, and causing a CPU controlling operation of said life pattern information generation apparatus to execute:

a life data accumulation step of accumulating life data indicating a usage history of the plurality of devices;

an episode creation step of creating, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

an episode analysis step of creating, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other; and

a life pattern interpretation step of identifying, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other,

wherein, with regard to subtrees having respective nodes of the frequent pattern tree as roots, the frequent pattern tree is constructed, in the episode analysis step, with a structure in which element data having a highest frequency becomes a root of a subtree, and

in the life pattern interpretation step, a device A and a device B which have a high frequency for being used in association with each other are identified, based on the frequent pattern tree, as a combination having a high association frequency, even when each of said device A and said device B are combined and used in association with various other devices.

39. **(New)** A device linkage control apparatus that controls a plurality of devices in linkage with one another, which is used by being connected to a life data accumulating apparatus that accumulates life data indicating usage of the plurality of devices in a user's daily life, the device linkage control apparatus comprising:

a life data accumulation unit operable to accumulate life data indicating a usage history of the plurality of devices;

an episode creation unit operable to create, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

an episode analysis unit operable to create, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other;

a life pattern interpretation unit operable to identify, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other; and

a control unit operable to control, in linkage with each other, said device sets having a high frequency for being used in association with each other, wherein, with regard to subtrees having respective nodes of the frequent pattern tree as roots, the episode analysis unit constructs the frequent pattern tree with a structure in which element data having a highest frequency becomes a root of a subtree,

the life pattern interpretation unit identifies, based on the frequent pattern tree, a device A and a device B, which have a high frequency for being used in association with each other, as a combination having a high association frequency, even when each of said device A and said device B are combined and used in association with various other devices, and

the control unit controls, in linkage with each other, at least said device A and said device B.

40. **(New)** A life pattern information generating apparatus that generates life pattern information for a device linkage control apparatus controlling a plurality of devices in linkage with each other based on the life pattern information, the life pattern information generating apparatus being used by being connected to a life data accumulating apparatus that accumulates life data indicating usage of a plurality of devices in a user's daily life, and comprises:

a life data accumulation unit operable to accumulate life data indicating a usage history of the plurality of devices;

an episode creation unit operable to create, from the life data, a plurality of episode data, based on episode data creation rules which determine devices that have been used in association with each other, said plurality of episode data having, as data, a plurality of the devices that have been used in association with each other;

an episode analysis unit operable to create, from the plurality of episode data, a frequent pattern tree representing, as a tree structure, a frequency at which the respective device sets are used in association with each other; and

a life pattern interpretation unit operable to identify, according to the frequent pattern tree, a combination of device sets as life pattern information, said device sets having a high frequency for being used in association with each other,

wherein, with regard to subtrees having respective nodes of the frequent pattern tree as roots, the episode analysis unit constructs the frequent pattern tree with a structure in which element data having a highest frequency becomes a root of a subtree, and

the life pattern interpretation unit identifies, based on the frequent pattern tree, a device A and a device B, which have a high frequency for being used in association with each other, as a combination having a high association frequency, even when each of said device A and said device B are combined and used in association with various other devices.